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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/539,813 | 10/27/2005 | Tomas Akenine-Moller | 0110-051 | 6678 |

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POTOMAC PATENT GROUP, PLLC
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| EXAMINER | |
|---|---|
| XU, KEVIN K | |
| **ART UNIT** | **PAPER NUMBER** |
| 2628 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|---|---|---|
| 3 MONTHS | 03/22/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/539,813 | AKENINE-MOLLER ET AL. | |
| | Examiner | Art Unit | |
| | Kevin K. Xu | 2628 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *09 February 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) *2,3,5,12,14 and 22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,6-11,13,15-21 and 23-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments filed 2/9/07 have been fully considered but they are not persuasive. Specifically applicant has amended claims 1, 11, 17, 18 and 25 to recite limitations of **both** previously recited claims 2 and 3, adding the limitations of "wherein the mirror planes are located on the edges of the pixel and the pattern has one sample point per pixel mirror plane, and wherein pixel values derived from said sample points are displayed on a screen", which changes the scope of claims 1, 11, 17, 18 and 25.

Furthermore, it should be noted that applicant has argued the cited references fail to explicitly teach "a sample pattern that has one sample point per pixel mirror plane, wherein the mirror planes are located on the edges of the pixel." Examiner respectfully disagrees. Firstly, it should be noted that applicant's specification discloses pixel mirror planes by reciting "mirror planes will then normally be parallel with the edges of the pixels and with spacing equal to the distance between edges of the pixels". (See p. 6 of applicant's disclosure). Leather (6999100) teaches one sample point per pixel mirror plane (Fig. 9, Col 14 lines 23-51, Col 13 lines 10- 38, Fig. 6) by showing, for example, the ys coordinate values of pixel 0 for the left most subpixel sample of pixel 0 (coordinate [2,2], 2 across and 2 down) may be considered a pixel mirror plane for pixel 0 because said coordinate ys of subpixel sample (coordinate [2,2]) is parallel to the edge of the pixel with spacing equal to the distance between edges of the pixels. Therefore for each of these mirror planes of pixel 0 (we could have picked pixel 1-3 instead for examples) there is only one sample point per pixel mirror plane because

each of these mirror planes (e.g. samples [2,2], [6, 12], [10, 6]) of pixel 0 have exactly one sample point on each of these planes. Therefore Leather teaches said pattern has "one sample point per pixel mirror plane." Futhermore, regarding applicant's amendment of said claims limiting one sample point per pixel mirror plane and wherein "mirror planes are located on the edges of the pixel", examiner will rely on the teachings of Nelson in subsequent rejections. See Below

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4, 6-11, 13, 15-21, 23-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leather (6999100) in view of Nelson (6636218).

Regarding claim 1, Leather teaches a sampling pattern covering an array of pixels for use in an anti-aliasing system. (Fig. 9, Col 14 lines 23-51, Col 13 lines 10- 38, Fig. 6) It should be noted that the sampling pattern as taught by Leather is specified as a particular spatial distribution of multisamples within the pixel array, showing multisample locations within a pixel quad relative to the center pixel quad (Fig 9) with each sample having a specified x and y distance (units of 1/12 pixel) from the center of the quad. (Col 14 lines 42-51) Furthermore, Leather teaches where each pixel has a pattern of sample points at a mirror plane within the array of pixels, wherein the sample point pattern of each pixel is a mirror image and *different* from the pattern of a directly

neighboring pixel. (Fig. 9, Col 14 lines 23-51). It should be noted that the pattern of sample points as taught by Leather is *mirrored or reflected* in both the x and y direction for each pixel of the pixel quad (pixel0, pixel1, pixel2, pixel3). (Fig. 9) For example, pixel0 is mirrored by mirror planes pixel1 and pixel2 respectively in the x and y direction (Fig. 9) and in addition pixel1 and pixel 2 are mirror images of pixel 0. Again it should be noted that the pattern of the mirror image (pixel1 and/or pixel2) is mirrored and also different from the pattern of its directly neighboring pixel. (pixel0) Furthermore Leather teaches the pattern has one sample point per pixel mirror plane, and wherein pixel values derived from said sample points are displayed on a screen. (Fig. 9, Col 14 lines 23-51, Col 13 lines 10- 38, Fig. 6). It should be noted that the ys coordinate values of pixel 0 for the left most subpixel sample of pixel 0 (coordinate [2,2], 2 across and 2 down) is considered a pixel mirror plane for pixel 0 because said coordinate ys of subpixel sample (coordinate [2,2]) is parallel to the edge of the pixel with spacing equal to the distance between edges of the pixels. Therefore for each of these mirror planes of pixel 0 (we could have picked pixel 1-3 instead for examples) there is only one sample point per pixel mirror plane because each of these mirror planes (e.g. samples [2,2], [6, 12], [10, 6]) of pixel 0 have exactly one sample point on each of these planes. However Leather does not explicitly teach sampling at the edges of the pixel. This is what Nelson teaches. (Fig. 4, Col 8 lines 4-21) It should be noted that Nelson teaches sampling each pixel at locations of (x.0, y.0), for example (1.0, 2.0) or (0.0, 0.0). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of sampling at the edges of the pixel into the system of

Leather in order to locate mirror planes on the edges of the pixel because sampling at only the edges (corners) allows valid sample point values to be computed merely from adding or subtracting a parameter delta from a base position (starting point) (e.g. to step from one tile to the next requires only adding 4 times dpdy base position to go down to the next tile or adding or subtracting 4 times dpdx base position to go left or right of a given tile) (Col 8, 24-32) and thus, memory can be saved and/or more efficient processing time can be achieved.

Claim 11 is similar in scope to claim 1 except for the recitation of pattern of sample points at the edges of the pixel. This is what Nelson teaches. (Fig. 4, Col 8 lines 4-21) It should be noted that Nelson teaches sampling each pixel at locations of (x.0, y.0), for example (1.0, 2.0) or (0.0, 0.0). It would have been obvious to one of ordinary skill in the art at the present time the invention was made to combine the teachings of pattern of sample points at the edges of a pixel into the system of Leather because sampling at only the edges (corners) allows valid sample point values to be computed merely from adding or subtracting a parameter delta from a base position (starting point) (e.g. to step from one tile to the next requires only adding 4 times dpdy base position to go down to the next tile or adding or subtracting 4 times dpdx base position to go left or right of a given tile) (Col 8, 24-32) and thus, memory can be saved and/or more efficient processing time can be achieved.

Claim 17 is similar in scope to claim 11 except for the recitation of creating an anti-aliased image. Leather also teaches this. (Col 13 lines 10-51, Fig. 6) Thus, claim 17 is rejected under similar rationale as claim 11.

Claim 18 is similar in scope to claim 11 except for the recitation of a GPU. Leather also teaches this. (Fig. 2 and Fig. 3) Thus, claim 18 is rejected under similar rationale as claim 11.

Claim 25 is similar in scope to claim 11 except for the recitation of a computer program loadable into an internal memory associated with a CPU, said CPU being operatively coupled to a GPU. Leather also teaches this. (Fig. 2, Fig 3, Col 9 line 57- Col 10 line 53) Thus, claim 25 is rejected under similar rationale as claim 11.

Consider claim 8, Leather teaches the use of a sampling pattern according to claim 1 in a pixel anti-aliasing system. (Fig. 9, Col 14 lines 23-51, Col 13 lines 10- 38, Fig. 6)

Consider claim 9, Leather teaches using a sampling pattern for processing a still image. (Fig. 1, Col 8 line 61- Col 9 line 55) It should be noted that it is known in the art that a video sequence is simply frames of still images.

Consider claim 10, Leather teaches using a sampling pattern for processing a video sequence. (Fig. 1, Col 8 line 61- Col 9 line 55)

Regarding claims 4, 13 and 21 Leather does not explicitly teach wherein the (x, y) coordinates of the sample points for a pixel are related according to (0, a), (a, 1), (b, 0) and (1, b) and wherein the (x, y) coordinates of the sample points for a pixel are related according to (0, b), (a, 0), (b, 1) and (1, a). This is what Nelson teaches. (Fig. 4, Col 8 lines 4-21) It should be noted that if a = 0 and b = 1 (for e.g.) then Nelson teaches (0, 0), (0, 1), (1, 0), (1, 1) which are sampling points at the edges of the pixel corners for one pixel and it should be noted that if b=1 and a= 2 (for e.g.) then Nelson teaches

sampling points at the edges of the pixel corners for a neighboring pixel. It would have been obvious to one of ordinary skill in the art at the present time the invention was made to combine the teachings of pattern of sampling points at the edges of a pixel into the system of Leather because sampling at only the edges (corners) allows valid sample point values to be computed merely from adding or subtracting a parameter delta from a base position (starting point) (e.g. to step from one tile to the next requires only adding 4 times dpdy base position to go down to the next tile or adding or subtracting 4 times dpdx base position to go left or right of a given tile) (Col 8, 24-32) and thus, memory can be saved and/or more efficient processing time can be achieved.

Regarding claims 6, 15 and 23 Leather does not explicitly teach sampling pattern wherein the sum of "a+b" is equal to 1. This is what Nelson teaches. (Fig. 4, Col 8 lines 4-21) It should be noted that if a = 0 and b =1, which gives corner sample points (0, 0), (0,1), (1, 0), (1,1) as taught by Nelson (Fig. 4) then the sum of "a+b" is equal to 1. It would have been obvious to one of ordinary skill in the art at the present time the invention was made to combine the teachings of pattern of sampling points at the edges of a pixel into the system of Leather because sampling at only the edges (corners) allows valid sample point values to be computed merely from adding or subtracting a parameter delta from a base position (starting point) (e.g. to step from one tile to the next requires only adding 4 times dpdy base position to go down to the next tile or adding or subtracting 4 times dpdx base position to go left or right of a given tile) (Col 8, 24-32) and thus, memory can be saved and/or more efficient processing time can be achieved.

Regarding claims 19-20, Leather teaches wherein the GPU is implemented in hardware and software. (Fig. 3 Col 10 line 54- Col 12 line 5)

Regarding claim 26, Leather teaches a computer program product embodied on a computer readable medium. (Fig. 2, Fig 3, Col 9 line 57-Col 10 line 53)

Consider claims 7, 16, and 24 neither Leather nor Nelson explicitly teaches wherein a = 1/3 and b =2/3. However Nelson teaches the other valid sample points may be (x.5, y.5) besides (x.0, y.0) without departing from the scope of the embodiments of the present invention. (Col 8 lines 9-14) It should also be noted that applicant has not shown any advantage in the disclosure for explicitly utilizing values of 1/3 and 2/3 for a and b respectively. Therefore, examiner will assume any arbitrary values of a or b will produce similar results (as shown by Nelson (x.5, y.5) or (x.0, y.0). Thus, it would have been obvious to one of ordinary skill in the art at the present time the invention was made to combine the teachings of pattern of sampling points at the edges of a pixel as taught by Nelson into the system of Leather because sampling at only the edges (corners) allows valid sample point values to be computed merely from adding or subtracting a parameter delta from a base position (starting point) (e.g. to step from one tile to the next requires only adding 4 times dpdy base position to go down to the next tile or adding or subtracting 4 times dpdx base position to go left or right of a given tile) (Col 8, 24-32) and thus, memory can be saved and/or more efficient processing time can be achieved.

Consider claims 27 and 29, Leather teaches wherein pattern has one and only one sample point per pixel mirror plane. (Fig. 9, Col 14 lines 23-51, Col 13 lines 10- 38,

Fig. 6). It should be noted that the ys coordinate values of pixel 0 for the left most subpixel sample of pixel 0 (coordinate [2,2], 2 across and 2 down) is considered a pixel mirror plane for pixel 0 because said coordinate ys of subpixel sample (coordinate [2,2]) is parallel to the edge of the pixel with spacing equal to the distance between edges of the pixels. Therefore for each of these mirror planes of pixel 0 (we could have picked pixel 1-3 instead for examples) there is only one sample point per pixel mirror plane because each of these mirror planes (e.g. samples [2,2], [6, 12], [10, 6]) of pixel 0 have exactly one sample point on each of these planes.

Regarding claims 28, 30 and 31 neither Leather nor Nelson explicitly teaches wherein a = 2/3 and b =1/3. However Nelson teaches the other valid sample points may be (x.5, y.5) besides (x.0, y.0) without departing from the scope of the embodiments of the present invention. (Col 8 lines 9-14) It should also be noted that applicant has not shown any advantage in the disclosure for explicitly utilizing values of 1/3 and 2/3 for a and b respectively. Therefore, examiner will assume any arbitrary values of a or b will produce similar results (as shown by Nelson (x.5, y.5) or (x.0, y.0). Thus, it would have been obvious to one of ordinary skill in the art at the present time the invention was made to combine the teachings of pattern of sampling points at the edges of a pixel as taught by Nelson into the system of Leather because sampling at only the edges (corners) allows valid sample point values to be computed merely from adding or subtracting a parameter delta from a base position (starting point) (e.g. to step from one tile to the next requires only adding 4 times dpdy base position to go down to the next tile or adding or subtracting 4 times dpdx base position to go left or right of a

given tile) (Col 8, 24-32) and thus, memory can be saved and/or more efficient processing time can be achieved.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin K. Xu whose telephone number is 571-272-7747. The examiner can normally be reached on 8:30AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman can be reached on 571-272-7653. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KX

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3/15/07

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